

University of Mississippi

eGrove

Honors Theses

Honors College (Sally McDonnell Barksdale
Honors College)

Spring 5-8-2022

Anxiety at the Beginning of the COVID-19 Pandemic: Associations between Health Anxiety, COVID-19 Anxiety, and Preventative Behaviors

Lauren Elmore

Follow this and additional works at: https://egrove.olemiss.edu/hon_thesis



Part of the [Clinical Psychology Commons](#)

Recommended Citation

Elmore, Lauren, "Anxiety at the Beginning of the COVID-19 Pandemic: Associations between Health Anxiety, COVID-19 Anxiety, and Preventative Behaviors" (2022). *Honors Theses*. 2660.

https://egrove.olemiss.edu/hon_thesis/2660

This Undergraduate Thesis is brought to you for free and open access by the Honors College (Sally McDonnell Barksdale Honors College) at eGrove. It has been accepted for inclusion in Honors Theses by an authorized administrator of eGrove. For more information, please contact egrove@olemiss.edu.

ANXIETY AT THE BEGINNING OF THE COVID-19 PANDEMIC: ASSOCIATIONS
BETWEEN HEALTH ANXIETY, COVID-19 ANXIETY, AND PREVENTATIVE
BEHAVIORS

by
Lauren Elmore

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of the requirements of the Sally McDonnell Barksdale Honors College.

Oxford
April 2022

Approved by:

Advisor: Professor Laura J. Dixon

Reader: Professor Stefan E. Schulenberg

Reader: Professor Rebekah E. Smith

ACKNOWLEDGMENTS

First, I would like to thank Dr. Laura J. Dixon for her support and encouragement throughout this journey. I couldn't have asked for a better advisor. Additionally, I would like to thank Drs. Stefan Schulenberg and Rebekah Smith for both being supportive members of my thesis defense committee. I would also like to thank the HART Lab for the invaluable experience I gained through the last three years of my undergraduate career. It not only fostered a love for research within me, but also provided a wonderful network of friendships that I wouldn't trade for the world. To the graduate students, I want to thank you for being great mentors and providing guidance to me throughout all aspects of my life. My time in the HART Lab has been a great experience, and one that I know has shaped my future.

I would also like to thank the Sally McDonnell Barksdale Honors College. Being a part of this community has pushed me to become a better student, scholar, and citizen. I cannot thank them enough for their support and guidance throughout my time as an undergraduate. I would also like to thank all of the professors of Psychology, Chemistry, Creative Writing, and Intelligence and Security Studies for their continued support. Their kindness, passion, and dedication to their subjects created a deep love for multiple facets of knowledge; and I know that I have grown as both an individual and scholar throughout each of these programs. I would also like to thank the Writing Center. There, I have had one of the most fantastic experiences working that I could've ever hoped for. I will never forget the friendships developed during my time there.

Finally, I would like to thank my family. Their continued support and belief in me through times of discouragement and hardships, along with their love during victories has meant the world to me. Thank you for supporting me and loving me through everything. It means more than I could ever express. I love you all and am forever grateful.

Abstract

Following the emergence of COVID-19, there was a significant increase in mental health issues (Shahyad & Mohammadi, 2020). Anxiety was of note (Salari et al., 2020), and preventative behaviors typical of health anxiety were prevalent. Health anxiety is the phenomenon of interpreting benign bodily sensations as symptoms of a more serious disease and is often accompanied with disproportionate thoughts of anxiety. Little work has examined the association between COVID-19 anxiety and health anxiety. The aims of this study were to: 1) characterize COVID-related anxiety symptoms, and 2) examine the bivariate associations of COVID-19 anxiety, health anxiety, and COVID-19 preventative behaviors among college students. We predicted higher health anxiety would be positively associated with COVID-19 anxiety and engagement in preventative behaviors. The sample included 263 participants (M_{age} ; 63.9% Female; 75.7% White) who were recruited through the psychology research pool at the University of Mississippi. Individuals participated in an online study and responded to self-report measures in the initial phase of the pandemic. In this sample, 6.5% reported clinical levels of health anxiety symptoms. Results indicated a significant positive correlation between COVID-19 anxiety and health anxiety symptoms. COVID-19 anxiety also showed a significant positive correlation with preventive behaviors. However, there was no significant association detected between COVID-19 preventative behaviors and health anxiety symptoms. Results suggest that while associated, COVID-19 anxiety and health anxiety appear to be measuring different attributes of anxiety. Understanding these distinctions is important for treatment purposes, as the behavioral presentation of these two constructs may not align fully and should be carefully assessed. Additionally, though generally adaptive, engagement in preventative behaviors for a prolonged period along with subsequent prolonged anxiety may contribute to long-term distress.

TABLE OF CONTENTS

Introduction.....1

Methods.....10

Results.....14

Discussion.....15

References.....21

Tables.....43

Appendices.....46

Introduction

SARS-COV-2, the virus that causes Coronavirus-19 (COVID-19), was first identified in Wuhan, China in December of 2019 before spreading worldwide in the spring of 2020. Since this time and as of March 2022, five variants have emerged, with each mutation increasing in transmissibility while typically decreasing in severity (Centers for Disease Control and Prevention [CDC], 2022; World Health Organization [WHO], 2022). COVID-19 primarily impacts the respiratory system within humans, and individuals who contract this disease often experience a cough, shortness of breath, fever, loss of taste and smell, and/or fatigue (CDC, 2021). COVID-19 was officially classified as a pandemic on March 11th, 2020 (WHO, 2020). A pandemic is defined by the nature of the virus, specifically its contagiousness, novelty, and severity. There is also a geographical criterion, which looks to the physical spread of the virus, often referring to a global infection (Morens, et al., 2009). In addition to meeting the geographic criteria, COVID-19 is considered to be highly contagious in nature and spreads rapidly from person to person (Liu et al., 2020; Severin, et al., 2020). With regard to novelty, although multiple coronavirus strains existed prior to 2019, COVID-19 is considered to be a new variant of coronavirus, which is associated with increased risk of illness morbidity and mortality (Kahn & McIntosh, 2005; Van Damme, et al. 2020). Lastly, the severity of the disease is partially dependent on the age of the individual and their health risk factors (CDC, 2020; Targher et al., 2020); however, COVID-19 has resulted in increased hospitalizations (Garg et al., 2020), heightened mortality rates (Baud et al., 2020), and long-term health issues (Becker 2020; Del Rio et al., 2020). Given the sudden onset of this global crisis, along with the nature of initial strains of the virus that have proven to be more severe than later strains (CDC, 2022), and the previous lack of protection capabilities such as vaccinations, which have shown to decrease the severity of

novel emerging strains (CDC, 2021), the current study focuses on the early stages of the pandemic.

The causes of the rapid spread of COVID-19 were initially unknown, which contributed to widespread lockdowns, uncertainty, and stress concerning this virus (Lin et al., 2020; Wu et al., 2021). COVID-19 has a basic reproductive number, or R_0 , of 2-2.5, indicating that typically, two to three individuals will be infected per one index patient (Dashraath et al., 2020). Comparatively, COVID-19 has a similar reproductive number to that of the 1918 influenza pandemic, with a R_0 value of 2.0-3.0, and a higher value than other, more recent influenza and COVID pandemics, which had a typical R_0 value range of 1.5 or less (Petersen et al., 2020). Although transmission was initially attributed to airborne transmission and direct contact with others (CDC, 2020), COVID-19 was subsequently discovered to spread via exposure and primarily transmitted through respiratory droplets, often spurred on by coughing or sneezing brought on by the illness (CDC, 2021; Salian et al., 2021). Given the dire consequence and ease of transmission, health organizations and governments worldwide provided guidelines to mitigate the spread of COVID-19 (Gostin & Wiley 2020).

Although restrictions were highly dependent on the state, the country, and even the institution, the CDC initially recommended restrictions that included: six feet (1.8 meters) social distancing, ten-day quarantine following a COVID-19 exposure, hand washing, and wearing face masks (CDC, 2020). Many state governments instituted stay at home orders to reduce congregation and spread. As a result of COVID-19 and related restrictions, many businesses operated below capacity, or completely shut down, due to reduced consumption and demand for goods and services (Acs & Karpman, 2020; Gostin & Wiley, 2020). These actions upended the labor market within the United States and caused a large spike in unemployment (Petrosky-

Nadeau & Valletta, 2020). Approximately 43.5% of adults reported a job or income loss (Acs & Karpman, 2020), and there was an increment in food insecurity across the U.S. (Raifman et al., 2021). Additionally, many schools, leisure activities such as restaurants and pubs, and religious institutions closed during the initial stages of the pandemic (Singh, 2020). Along with this, individuals partook in preventative behaviors to mitigate the spread of COVID-19, especially during the initial emergence of the pandemic, such as stockpiling supplies and grocery pickup in order to limit contact with others, social distancing and isolation from others, and handwashing (Nazione et al., 2021). In addition, consuming COVID-19 related news via social media, news outlets, and health professionals became commonplace (Nazione et al., 2021), and this type of consumption has been shown to shape preventative health behaviors (Lewis et al., 2012; Thrasher et al., 2016; Welch Cline, 2003). Altogether, the effects of these shifts in activities and economic consequences contributed to a range of negative impacts on a person's mental health (Roberts et al., 2020; Rohde et al., 2016).

In the early phases of the pandemic, studies indicated a heightened prevalence of anxiety (23.5%), depression (25%), insomnia (19.1%), and posttraumatic stress symptoms (33%) across various populations, including adults (Fekih-Romdhane et al., 2020), college students (Santabárbara et al., 2021), medical workers (Kotera et al., 2021), and pregnant women (Bueno-Notivol et al., 2021; Kokou-Kpolou et al., 2020; López-Morales et al., 2021; Shahyad & Mohammadi, 2020). Over the course of the pandemic, not only has mental health worsened, but mental health support has also declined (Dozois, 2021). This is further compounded by decreases in social support during quarantine. Conversely, strong support systems were shown to reduce anxiety and stress levels during quarantine periods (El Keshky et al., 2021). However, the closure of schools, home confinement, decreased access to social support systems, and lack of

routine have been found to negatively affect an individual's social network and social support, which contributes to the worsening of overall mental health wellness (Giebel et al., 2020; Labrague et al., 2020).

Anxiety has been particularly problematic during the pandemic (Salari et al., 2020). Anxiety is characterized as an internal reaction of apprehension and physiological arousal in response to external world dangers, real or perceived (Speilberger, 2013). Characteristics of the pandemic such as fear of illness contraction, socioeconomic difficulties, and social isolation lend to symptoms of anxiety (Brooks et al., 2020; Fiorillo & Gorwood, 2020; Shah et al., 2020; Shigemura et al., 2020). Anxiety associated with contagion has led to a decrease in social contact and less social relationships due to fears of infecting family members or coming in contact with potential contagions (Kutana & Lau, 2021). In a study conducted in Brazil, anxiety symptoms were determined to have multiplied by 7.4 during the pandemic, particularly among populations aged 18 to 30 (Feter et al., 2020). This sharp increase in anxiety is echoed within other research conducted during the initial height of the pandemic. Notably, a recent review concluded that increases in anxiety were demonstrated across 41 countries during the initial months of the pandemic (Gamonal-Limcaoco et al., 2021). For instance, Li et al. (2020) reported that, based on a nationwide survey in China distributed in February of 2020, the prevalence of anxiety was 20.4%, a large increase from the anxiety prevalence of 4% prior to the pandemic. Additionally, in the United States, multiple studies reported significant increases in anxiety in university samples, one citing a 7.3% increase in anxiety in undergraduate students (Kibbey et al., 2021). Likewise, Rudenstine et al. (2021) indicated that 40% of the university student sample met the clinical cutoff criteria for anxiety. Though prolonged through the course of the pandemic, this

global uptick of anxiety was especially noted in the beginning stages of the pandemic (Dozois, 2021; Lauri Korajlija & Jokic-Begic, 2020; Li et al., 2020; Salari et al., 2020).

Individuals with anxiety also tend to express excessive worries about their health (Abramowitz et al., 2007; American Psychiatric Association, 2000). Health anxiety is defined as the phenomenon of interpreting bodily sensations or changes as symptoms of a more serious disease or issue and is often accompanied with disproportionate thoughts of anxiety related to the symptoms (Abramowitz et al., 2007; Asmundson et al., 2010; Maass et al., 2020). Health anxiety is also known as Illness Anxiety Disorder in the DSM-5 (French & Hameed, 2021), or more previously known as hypochondriasis in the DSM-IV (Almalki et al., 2016). Severe health anxiety typically arises during periods of serious illness, following the loss of a relative, or exposure to disease related information and media (Asmundson et al., 2010). In community samples, the prevalence of health anxiety is estimated to range from 3.4% to 6.0% (Maas et al. 2020; Tyrer et al., 2011). Overall, women typically have higher levels of health anxiety (Kirmizi et al. 2021). However, though women presented with significantly higher worry and reassurance-seeking behaviors, key presentations of health anxiety were found to be invariant across gender (MacSwain et al. 2009). Additionally, younger adults oftentimes report higher levels of health anxiety than older adults (Gerolimatos & Edelstein, 2012). Health anxiety has had a reported long-term impact on an individual's physical and mental health functioning (Fink et al. 2010). Studies have demonstrated that those with health anxiety report similar physical component scale scores, which measures physical problems and general health, as individuals with cancer, lower back pain, and diabetes (Fink et al., 2010; Ware & Kosinski, 2001). Individuals with health anxiety are more likely to take sick leave (Eilenberg et al., 2015), frequently visit the doctor and

other out-patient clinics (Fink et al., 2010; Tyrer 2018), and engage in a significantly more safety behaviors than non-clinical populations (Olatunji et al., 2011).

To further understand health anxiety, the cognitive behavioral model of health anxiety focuses on maladaptive patterns of thoughts and behaviors. The primary cognitive indicators include the continual misinterpretation of benign physical symptoms as a sign of disease (Barsky & Klerman, 1983), and overestimations of the probability of serious illnesses as a result of a perception that bodily sensations are more dangerous than they actually are (Warwick & Salkovskis, 1990). For instance, a person with health anxiety may interpret a benign sensation, such as a headache, to be symptomatic of a graver disease such as cancer or a stroke. These cognitive factors inform engagement in behaviors (Doherty-Torstrick et al., 2016; Jasper & Withhöft 2011; Warwick & Salkovskis, 1990). These behaviors include body checking, seeking reassurance, hand-washing, and other prescribed mitigation efforts of specific diseases (Asmundson et al., 2010; Dennis et al., 2021). Such avoidance behaviors have been compared to that of obsessive-compulsive disorder as the behaviors only temporarily relieve anxiety and perpetuate health anxiety beliefs in the long-term (Solem et al., 2015; Warwick & Salkovskis 1990). Two patterns of safety seeking and avoidance behaviors are observed – care-seeking and care-avoidance (Almalki et al., 2016). Care-seeking is defined by excessive behaviors of pursuing medical care and diagnostic testing, whereas care-avoidance behavior is characterized by feelings of fear regarding medical care and diagnosis, and a consequent evasion of it (American Psychiatric Association, 2013). An individual who exhibits care-avoidance behavior would be more likely to evade public spaces, social distance, and avoid medical visits (Lu, et al., 2020). Patients can also exhibit symptoms of naïve realism, the belief that the complaints come from real physical problems, thoughts of morbid categorizations, and other manifestations of

health concerns (Holder-Perkins et al., 2000). Health fears will persist even if a physical examination is conducted by a professional (French & Hameed, 2021).

Health anxiety has been commonly reported in past pandemics. In pandemics, illness-specific anxiety emerges, or a fear of a specific disease (Blakey & Abramowitz, 2017; Tizzoni et al., 2020; Wheaton et al. 2012). Illness-specific anxiety has been defined in past literature to be a form of health anxiety (Brand et al., 2013; Taylor & Asmundson, 2004). This emergence of health anxiety is in part due to the nature of a pandemic and its potential impacts to an individual's physical wellness, which lends itself to bringing out circumstances that may trigger health anxiety (Blakey & Abramowitz, 2017; Dennis et al., 2021). For instance, SARS, similar to COVID-19, originated in China and became classified as a pandemic in 2003 (Cherry & Krogstad, 2004; Zhong et al., 2003). Psychological issues emerged specifically within college students immediately following the outbreak, and a positive association was found between students who engaged in avoidant behaviors related to the disease and the aforementioned mental health impacts (Main et al., 2011). One year after the outbreak, survivors of SARS reported higher levels of anxiety, depression, and posttraumatic symptoms that were persistent (Lee et al., 2007).

The Zika virus (ZIKV), a virus cited to cause birth defects in infected pregnant mothers, emerged in 2015 in Brazil before spreading to tropical parts of the Americas (Musso et al., 2019; Waggoner & Pinsky, 2016). During this period of time, high levels of psychological stress were reported in mothers of children with presumed congenital defects due to Zika (de Oliveria et al., 2017). Zika related anxiety was influenced by a multitude of factors such as the level of knowledge of the virus and popular media reports (Blakey & Abramowitz, 2017; Tizzoni et al., 2020). Patterns of disease related anxiety were also influenced by the mortality, or the severity of

symptoms, and the morbidity, or probability of contraction, of the disease (Blakey & Abramowitz, 2017).

A similar, related increase of anxiety was seen with the H1N1, or swine flu, pandemic in 2009 (Garske et al., 2009). Those who did not contract the H1N1 virus experienced a greater degree of anxiety than those who contracted it did (Taha et al. 2014). The H1N1 pandemic was associated with high levels of anxiety and compensatory behaviors (handwashing, information searching, etc.). Health anxiety, contamination fears, and disgust sensitivity were all predictors of H1N1 related anxiety (Wheaton et al. 2012). Overall, there was an increase in public anxiety. This was partly due to the increase in prevalence of lower-level positive words and death words used in blogs and other media reports; and there was an increase in information seeking behaviors according to a web behavior analysis conducted during the H1N1 pandemic (Tausczik et al., 2012).

Despite the similarities to other mental health effects during past pandemics, COVID-19 has posed a unique environment to individuals, rendering it an important phenomenon to be studied. To date, there have been no other pandemics that have engaged in extensive mitigation effort such as mask wearing and the shutting down of businesses and schools (Yen et al., 2014). Additionally, the timeline of restrictions for COVID-19 has far exceeded that of other pandemics (Yen et al., 2014). Along with this, the overall case and death toll of COVID-19 usurped the death tolls of other well-known pandemics within the initial months of the outbreak (Burkardt, 2011; CDC, 2020; CDC, 2021; Hui et al., 2003).

Although young adults typically experience less severe symptoms brought on by COVID-19 as compared to older age groups (Bonanad et al., 2020), they are most at risk for psychological distress during the pandemic (Glowacz & Schmits, 2020; Shahyad &

Mohammadi, 2020). Some individuals have been more severely psychologically affected by COVID-19, including patients of COVID-19 (Toulabi et al., 2021), medical staff (Kebede et al., 2021), children (Shoshani & Kor, 2021), university students (Kibbey et al., 2021), and pregnant women (Glowacz & Schmits, 2020; Saadati et al., 2021; Shahyad & Mohammadi, 2020).

However, college students and those with higher levels of education are more likely to experience stress, anxiety, and depression during the pandemic (Islam et al., 2020; Li et al., 2020; Moghanibashi-Mansourieh, 2020; Salari et al., 2020). Younger people were also found to engage in more health-related anxiety behaviors during the pandemic (Barron Millar et al., 2021).

With the emergence of the novel COVID-19 pandemic, there has been an increase in the prevalence of anxiety. The subsequent behavioral reactions and health centric nature of the crisis itself suggest a relationship between COVID-19 anxiety and health anxiety. The purpose of this study was to examine the relationship between COVID-19 anxiety and health anxiety, specifically within university students as these trends have been of primary note in undergraduate sample populations. Individuals with high health anxiety during the pandemic are posited to interpret benign body sensations as evidence of something more severe (Asmundson & Taylor, 2020). For instance, in the genesis of the pandemic when there were minimal cases of COVID-19, individuals would go to hospitals for coughs or benign fevers in belief that it was symptomatic of the disease (Asmundson & Taylor, 2020). These behaviors and cognitive distortions, in part, were particularly observed during the initial stages of the COVID-19 outbreak when little was known about the virus, including limited availability for testing and a lack of a vaccine (Armstrong et al., 2020; Ramdas et al., 2020). Studies show that COVID-19 anxiety can lead to health-anxiety counter measures like continually checking symptoms, surfing

the internet for information regarding the virus, and requesting reassurance from others (Tyrer, 2020), making it particularly comparable to that of health anxiety. However, research is needed to further understand the relationship between COVID-19 anxiety and health anxiety as, to date, few studies have examined these two constructs in relation with one another. As such, the first aim of this study was to characterize COVID-19 related characteristics among university students. The second aim was to evaluate the bivariate associations between health anxiety, COVID-19 anxiety, and engagement in preventative behaviors. We predicted higher health anxiety would be positively associated with COVID-19 anxiety and engagement in preventative behaviors.

Methods

Participants and Procedure

Participants ($N = 319$) in this study were recruited through a psychology research pool (Sona Systems) at the University of Mississippi. The participants were given course credit contingent with their participation of the study. Data was collected online through Qualtrics between March 19th, 2020, and May 1st, 2020. The University of Mississippi transitioned to remote operations on March 12th, 2020, which was consistent with the general response of universities in the United States. Students were given the recommendation to return to their hometown during this period.

Interested individuals signed up for a larger study examining responses to interpersonal and personal stressors, and interested individuals received information about the study and were asked to provide informed consent. Following consent, participants completed an online battery

of questionnaires. Only individuals above the age of 18 were eligible for the study. Participants who did not pass attention check items were excluded from the study ($n = 56$).

The final sample consisted of 263 participants, including individuals identifying as White (75.7%), Black (14.4%), Asian (3.0%), Multiracial (2.7%), and Latinx (2.3%). Two percent of the sample identified as “other” or “preferred not to say”. The majority of the participants were female (63.9%) and were classified as freshmen (67.3%). See Table 1 for full demographic characteristics. All procedures and measures were approved by the University of Mississippi’s Institutional Review Board (IRB).

Measures

Demographic Information. Participants answered a questionnaire that assessed their sex at birth, race and ethnicity, school classification, pre- and post-COVID-19 housing, pre- and post-COVID-19 employment, and time spent on the internet and social media. The questionnaire also evaluated changes in these characteristics pre- and post-university shutdown and other related COVID-19 closures.

Short Health Anxiety Inventory (SHAI). Participants answered an 18-question survey regarding health anxiety. The SHAI assesses health anxiety symptoms, which includes excessively worrying about an illness and having unrealistic fears of being contaminated or exposed to contagions (Abramowitz et al., 2007; Bailer et al., 2016). The SHAI has been shown to identify people who have excessive worry regarding their health (Abramowitz et al., 2007). The SHAI utilizes a Likert-type scale that presents a range of “agree” to “disagree” statements for a singular question (Ho, 2017). Four options were presented for each given statement, which examined the severity of the individual’s symptoms of health anxiety. Participants were provided with items that ranged from “0 = I do not have any difficulty taking my mind off thoughts about

my health” to “3 = Nothing can take my mind off thoughts about my health.” Each item was scored from a scale from 0 to 3, with higher scores indicating a more severe level of health anxiety symptoms. Total scores can range from 0 to 54 on the SHAI. The SHAI has shown consistent reliability and validity within university student populations (Abramowitz, et al. 2007). There are two primary subscales included in the SHAI, including the illness likelihood subscale and the negative consequences of an illness subscale. The illness likelihood subscale examines the individual’s beliefs on the probability of them becoming ill (e.g., “I usually feel at high risk for developing a serious illness”). The negative consequences, or illness severity, subscale targets the individual’s beliefs as to how damaging the illness would potentially be to their life (e.g., “a serious illness would ruin every aspect of my life”; Alberts et al. 2013). A clinical cutoff score of 27 or above reliably identifies individuals with clinical health anxiety (Alberts et al. 2013). This measure showed good internal consistency in this sample ($\alpha = .87$). See Appendix A.

Experience of COVID-19. A questionnaire examining COVID-19-related experiences was developed by the lab based on recommendations from the CDC. This measure included three subsections that examined: 1) COVID-19’s impact on an individual’s life; 2) COVID-19-related anxiety symptoms, and 3) a checklist of the precautions that the participant engaged in based on the pandemic and current safety guidelines. See Appendix B.

COVID-19 Health Questionnaire. The Health Questionnaire portion was a six-item section. First, participants answered three questions regarding whether or not they personally had tested positive for COVID-19 and if they knew of any individuals that had tested positive for the disease. Second, two items examined potential exposure encounters by assessing interactions, including: 1) an approximation of number of individuals encountered on average each day; and

2) an approximation of the public places attended in the past week. The final question asked about the impact that COVID-19 had on their lives on a 5-point Likert-type scale, ranging from “No disruption at all” to “My life is completely disrupted, and I cannot function at all.”

COVID-19 Anxiety Scale. At the time of the study, there was a lack of measures available to assess COVID-19 anxiety. As such, this portion of questionnaire was adapted from the Dimensional Obsessive-Compulsive Scale (DOCS; Abramowitz, et al. 2010) to specifically assess anxiety related to COVID-19. Participants answered a five-item questionnaire related to their thoughts (e.g., catastrophic thoughts about COVID-19), behaviors (e.g., avoidance of COVID-19-related stimuli), and overall distress associated with COVID-19-related cues within the past two weeks. For example, engagement in behaviors was assessed by the question, “To what extent have you avoided situations in order to prevent concerns with COVID-19 or having to spend time washing, cleaning, or showering?”. Each item was rated on a five-point, Likert-type scale, ranging from 0 = little to no severity and frequency in COVID-19-related thoughts and behaviors to 4 = indicating extreme or very frequent COVID-19-related thoughts and behaviors. The five items were summed, resulting in a total score ranging from 0 to 20, with higher scores indicating greater COVID-19-related anxiety. This measure showed acceptable internal consistency in this sample ($\alpha = .71$).

COVID-Precautions Checklist. The final item in this measure was a checklist of precautions. The initial question asked: “Which of the following precautions have you taken or are you taking in response to COVID-19?” and 15 items were included in this list. Examples of the items included measures taken to mitigate the spread of COVID-19 (e.g., canceling travel) and ensuring personal safety and security (e.g., stockpiling groceries). Each item that was

endorsed was scored as a “1”, and the items were summed to produce a total count score. This measure showed good internal consistency in this sample ($\alpha = .80$).

Results

COVID-19-related Participant Characteristics

Of the participants, 79.8% ($n = 210$) had experienced a housing relocation due to the pandemic. Regarding COVID-19 positive tests, 0.4% ($n = 1$) reported being diagnosed with COVID-19, 10.6% ($n = 28$) participants reported having a family or friend that had tested positive for the disease, and 44.1% ($n = 116$) reported knowing an acquaintance that tested positive. When asked about the impact that COVID-19 had had on them, 1.9% ($n = 5$) reported no impact, 12.2% ($n = 32$) reported a little impact, 58.9% ($n = 155$) reported a moderate impact, 22.8% ($n = 60$) reported a great deal of impact, and 4.2% ($n = 11$) reported that they were extremely impacted by the pandemic. For a full summary of these characteristics, see Table 1.

Descriptive Statistics and Zero-Order Correlations

On the SHAI, 6.5% ($n = 17$) of individuals met the clinical cutoff for health anxiety. The mean SHAI total score was 13.46 ($SD = 7.35$). All means, standard deviations, and observed ranges are reported in Table 3. Preventative behaviors were normally distributed, and COVID-19 behaviors were considered to be a continuous variable. See Table 2 for a full summary of COVID-19 preventative behaviors.

Hypothesis Testing

To test the study hypothesis, bivariate correlation analyses were conducted. Consistent with the hypothesis, results indicated a positive correlation between COVID-19 anxiety and health anxiety ($r = .368, p < .01$). COVID-19 anxiety also demonstrated a positive correlation

with the illness likelihood subscale of the SHAI ($r = .342, p < .01$) and a positive correlation with the negative consequences subscale ($r = .300, p < .01$). COVID-19 anxiety showed a positive correlation with COVID-19 preventative behaviors ($r = .342, p < .01$). However, contrary to the original hypothesis, there was no significant association detected between health anxiety symptoms and COVID-19 preventative behaviors. All associations are reported in Table 3.

Discussion

The purpose of this study was to examine the associations between health anxiety and COVID-19 anxiety during the early stages of the pandemic. In particular, health anxiety and COVID-19 anxiety's association with an individual's engagement in preventative behaviors was evaluated. We predicted that individuals with higher scores of health anxiety would also report higher levels of COVID-19 anxiety – and that these symptoms would be associated with engagement in a greater number of preventative behaviors. The timeline of this study is especially important for understanding the results as attitudes during the beginning of the pandemic were influenced by heightened uncertainty and lack of available resources (Bryce et al., 2020). During the initial height of the pandemic, there were sharp increases in anxiety reported across multiple populations (Dozois, 2021; Feter et al., 2020; Lauri Korajlija & Jokic-Begic, 2020; Li et al., 2020; Salari et al., 2020). Though few pandemics have reached this magnitude, this increment in anxiety has also been reported in past pandemics and is important for the understanding of future reactions in response to potential future pandemics (Blakey & Abramowitz, 2017; Garske et al., 2009).

The study sample reported a prevalence of 6.5% clinical levels of health anxiety. This rate is slightly above community samples reported in previous literature, which indicate health

anxiety is present in 3.4 to 6.0% of the population (Maass et al., 2020; Tyrer et al., 2011). This discrepancy may be in part explained by previous literature indicating that younger individuals are more likely to report higher levels of health-anxiety and engage in health-related anxiety mitigation behaviors (Gerolimatos & Edelstein, 2012). In addition, this heightened rate could also be due to the pandemic. Health anxiety, in general, is often brought about by severe health related events or consuming threatening health related media (Asmundson et al., 2010; Rachman, 2012), which has been characteristic of the COVID-19 pandemic, especially during its genesis (Chan et al., 2020).

The correlation analyses revealed a positive correlation between health anxiety and COVID-19 anxiety. The total score of health anxiety, along with both the negative consequences and the illness likelihood subscale of the SHAI, were all positively correlated with COVID-19 anxiety. This is both consistent with the hypothesis and with past literature analyzing illness-specific anxiety in epidemics. Past studies reported an increase in health anxiety related cognitive dysfunctions, such as an increment in interpreting mild symptoms to be due to an infection of COVID-19 (Kazan Kızılkurt, 2020) and that there were significant increases in preventative behaviors across adult populations (Dozois, 2021; Lauri Korajlija & Jokic-Begic, 2020; Li et al., 2020; Salari et al., 2020).

In contrast to the current findings, previous research during pandemics have reported a positive association between health anxiety and illness-specific preventative behaviors (Main et al., 2011; Wheaton et al., 2012). This discrepancy could partially be due to the fact that many studies classify illness-specific anxiety to be health anxiety and do not examine the intricacies of the relationship between the two syndromes. Health anxiety refers to generalized fears over health concerns, rather than a specific focus on a health disorder, as with illness-specific anxiety (Abramowitz et al., 2007; Asmundson et al., 2010; Taylor & Asmundson, 2004). As such,

illness-specific anxiety could either be classified as 1) a subtype of health anxiety or 2) a phobia. Currently, literature treats illness-specific anxiety as health anxiety (Taylor & Asmundson, 2004). However, recent studies regarding coronavirus have also described it as a phobia, coining the term “coronaphobia” (Arpaci et al., 2021). A phobia is defined as a disproportionate fear reaction to an object or situation (American Psychiatric Association, 2013). In general, the cognitive (e.g., catastrophic thoughts of illness symptoms), behavioral (e.g., avoidance of illness-related cues), and emotional (e.g., anxiety, fear) symptoms of these different syndromes are similar; yet, there may be some distinctions. Notably, there may be differences in the types of general health behaviors and COVID-19 behaviors that are influenced by context. For instance, the current study included behaviors specific to COVID-19 guidelines (e.g., “Stockpile on paper goods, such as toilet paper and paper towels”, “Engaging in social distancing”), which are more context specific than general health anxiety behaviors (e.g., frequent checking and reassurance with others, palpitating lumps and abrasions; Asmundson et al., 2010). Consequently, consideration of the specific context may be important and may account for the lack of support in the association between health anxiety and preventative behaviors in the current study.

As aforementioned, this study was conducted in March of 2020 during the initial stages of the pandemic. At this time, little information about the disease was known. Precautionary measures were preliminary as transmission information was unknown at the time, along with little knowledge regarding the severity of the disease (CDC, 2020). Additionally, there was an overwhelming lack of testing capabilities, which led to uncertainty about the true prevalence of COVID-19. Future studies should examine COVID-19 anxiety longitudinally. To date, there have been five variants of the disease, all presenting with varying levels of severity and contagiousness (WHO, 2022). Along with this, vaccines have become a prominent method of

severity mitigation (CDC, 2022), and testing has become widely available (CDC, 2022). These advances impact the general uncertainty surrounding the disease. Intolerance of uncertainty, characterized by a need to be certain and a lack of coping with unpredictable changes and inherently ambiguous situations, plays a role in both anxiety and specifically health anxiety, and could have resulted in higher rates of health anxiety at the time of the study (Fergus & Bardeen, 2013; Fergus & Valentiner, 2011; Obsessive Compulsive Cognitions Working Group [OCCWG], 1997). A longitudinal study could highlight the role that intolerance of uncertainty played in COVID-19 anxiety prevalence and severity, along with the impact this had on preventative behaviors.

There were several limitations to this study. This study was cross-sectional, and therefore, causation cannot be inferred. Additionally, this study relied on self-report measures, which could leave to bias in responses (Donaldson & Grant-Vallone, 2002; Howard & Dailey, 1979). Along with this, the COVID-19 thoughts and behaviors measure was developed by the lab and was not assessed for reliability and validity at the time of the study. In this measure, the preventative actions checklist did not account for the frequency in which individuals engaged in behaviors, rather it focused on whether an individual had engaged in the behavior or not. Therefore, excessive behaviors such as constant handwashing or information checking was not assessed. As this study was conducted at the beginning of the pandemic, many individuals endorsed preventative behaviors in line with national recommendations. However, health anxiety is characterized by excessive engagement in such behaviors, as many of the safety-seeking behaviors, when done in moderation, are generally adaptive (American Psychiatric Association, 2013). While this study, despite this lack of distinction, did indicate that preventative behaviors are positively associated with COVID-19 anxiety, future studies should examine the frequencies

of behaviors alongside the study as to get a more accurate assessment of the behavioral aspect of COVID-19 anxiety.

This study was not a diverse sample. The study population was college students, with the mean age being 19.57 years old. Age may play an important role, specifically in regard to COVID-19 anxiety. Though younger individuals are more likely to have health anxiety (Boston & Merrick, 2010; Gerolimatos & Edelstein, 2012) and general psychological stress in older individuals during the pandemic was reportedly lower (García-Portilla et al., 2021), COVID-19 health concerns are most severe in older populations, increasing their mortality risk factor, which subsequently could increase their potential COVID-19 anxiety. Along with this, the sample was majority White (75.7%). Race may also be another influential factor when examining the results of this study. Previous studies indicated that Black, Indigenous, and People of Color identified respondents were significantly more likely to report virus related anxiety during the pandemic (Hofmann, 2021). In addition, Black, Latinx, and American and Alaskan Native persons in the United States experience higher rates of COVID-19 related hospitalization and death as compared with non-Hispanic White populations (CDC, 2021). Given a more diverse sample, this could impact health concerns and preventative behaviors, along with the reported prevalence of health anxiety in future samples.

This study indicates that while associated, COVID-19 anxiety and health anxiety appear to be measuring different attributes of anxiety. Illness-specific anxiety was previously classified as a type of health anxiety (Taylor & Asmundson, 2004). However, this study indicates that the relationship between these constructs may prove to be more complex: COVID-19 anxiety, but not health anxiety, was significantly associated with preventative behaviors. Understanding these distinctions is important for treatment purposes, as the behavioral presentation of these two

constructs may not align and should be assessed on such bases. Additionally, while in line with national recommendations at the time, this study indicated significant associations between preventative behaviors and anxiety, which could become impairing and distressful. Along with this, the pandemic has lasted for an extended period of time, and engagement in preventive behaviors for a prolonged period along with prolonged anxiety may contribute to long-term distress.

References

- Abramowitz, J. S., Deacon, B. J., Olatunji, B. O., Wheaton, M. G., Berman, N. C., Losardo, D., Timpano, K. R., McGrath, P. B., Riemann, B. C., Adams, T., Björgvinsson, T., Storch, E. A., & Hale, L. R. (2010). Assessment of obsessive-compulsive symptom dimensions: Development and evaluation of the Dimensional Obsessive-Compulsive Scale. *Psychological Assessment, 22*(1), 180–198. <https://doi.org/10.1037/a0018260>
- Abramowitz, J. S., Deacon, B. J., & Valentiner, D. P. (2007). The Short Health Anxiety Inventory: Psychometric Properties and Construct Validity in a Non-clinical Sample. *Cognitive therapy and research, 31*(6), 871–883. <https://doi.org/10.1007/s10608-006-9058-1>
- Acs, G., & Karpman, M. (2020). Employment, income, and unemployment insurance during the COVID-19 pandemic. *Urban Institute*. <https://www.urban.org/research/publication/employment-income-and-unemployment-insurance-during-covid-19-pandemic>
- Alberts, N. M., Hadjistavropoulos, H. D., Jones, S. L., & Sharpe, D. (2013). The Short Health Anxiety Inventory: a systematic review and meta-analysis. *Journal of anxiety disorders, 27*(1), 68–78. <https://doi.org/10.1016/j.janxdis.2012.10.009>
- Almalki, M., Al-Tawayjri, I., Al-Anazi, A., Mahmoud, S., & Al-Mohrej, A. A. (2016). Recommendation for the Management of Illness Anxiety Disorder Patients Abusing the Health Care System. *Case Reports in Psychiatry*. <https://doi.org/10.1155/2016/6073598>
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders*. (5th Edition). Washington, DC.

Armstrong, R. A., Kane, A. D., Cook, T. M. (2020). Outcomes from intensive care in patients with COVID-19: a systematic review and meta-analysis of observational studies.

Anaesthesia. <https://doi.org/10.1111/anae.15201>

Arpaci, I., Karatas, K., Baloglu, M. & Haktanir, A. (2022). COVID-19 Phobia in the United States: Validation of the COVID-19 Phobia Scale (C19P-SE), *Death Studies*, 46:3, 553-559, <https://doi.org/10.1080/07481187.2020.1848945>

Asmundson, G. J., Abramowitz, J. S., Richter, A. A., & Whedon, M. (2010). Health anxiety: current perspectives and future directions. *Current Psychiatry Reports*.

<https://doi.org/10.1007/s11920-010-0123-9>

Asmundson, G. J., & Taylor, S. Coronaphobia: Fear and the 2019-nCoV outbreak. (2020).

Journal of Anxiety Disorders. 70:102196. <https://doi.org/10.1016/j.janxdis.2020.102196>

Bailer, J., Kerstner, T., Witthöft, M., Diener, C., Mier, D. & Rist, F. (2016) Health anxiety and hypochondriasis in the light of DSM-5. *Anxiety, Stress & Coping*, 29:2, 219-

239, <https://doi.org/10.1080/10615806.2015.1036243>

Barron Millar, E., Singhal, D., Vijayaraghavan, P., Seshadri, S., Smith, E., Dixon, P., Humble, S., Rodgers, J., & Sharma, A. N. (2021). Health anxiety, coping mechanisms and COVID-

19: An Indian community sample at week 1 of lockdown. *PLoS ONE*, 16(4), Article

e0250336. <https://doi.org/10.1371/journal.pone.0250336>

Barsky, A. J., & Klerman, G. L. (1983). Overview: Hypochondriasis, bodily complaints, and somatic styles. *The American Journal of Psychiatry*, 140(3), 273-

283. <https://doi.org/10.1176/ajp.140.3.273>

- Baud, D., Qi, X., Nielsen-Saines, K., Musso, D., Pomar, L., & Favre, G. (2020). Real estimates of mortality following COVID-19 infection. *Lancet Infectious Diseases*.
[https://doi.org/10.1016/S1473-3099\(20\)30195-X](https://doi.org/10.1016/S1473-3099(20)30195-X)
- Becker, R. C. (2020). COVID-19 update: Covid-19-associated coagulopathy. *Journal of Thrombosis and Thrombolysis*. 54-67. <https://doi.org/10.1007/s11239-020-02134-3>
- Blakey, S. M., & Abramowitz, J. S. (2017). Psychological Predictors of Health Anxiety in Response to the Zika Virus. *Journal of clinical psychology in medical settings*, 24(3-4), 270–278. <https://doi.org/10.1007/s10880-017-9514-y>
- Bonanad, C., García-Blas, S., Tarazona-Santabalbina, F., Sanchis, J., Bertomeu-González, V., Fácila, L., Ariza, A., Núñez, J., & Cordero, A. (2020). The Effect of Age on Mortality in Patients With COVID-19: A Meta-Analysis With 611,583 Subjects. *The Journal of Post-Acute and Long-Term Care Medicine*. (7):915-918.
<https://doi.org/10.1016/j.jamda.2020.05.045>.
- Boston, A. F., & Merrick, P. L. (2010). Health anxiety among older people: an exploratory study of health anxiety and safety behaviors in a cohort of older adults in New Zealand. *International psychogeriatrics*, 22(4), 549–558.
<https://doi.org/10.1017/S1041610209991712>
- Brand, J., McKay, D., Wheaton, M., & Abramowitz, J. (2013). The relationship between obsessive compulsive beliefs and symptoms, anxiety and disgust sensitivity, and Swine Flu fears. *Journal of Obsessive-Compulsive and Related Disorders*. 2(2), pp. 200-206
<https://doi.org/10.1016/j.jocrd.2013.01.007>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of

the evidence. *The Lancet*. 395(10227):912-920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)

Bryce, C., Ring, P., Ashby, S. & Wardman, J. K. (2020) Resilience in the face of uncertainty: early lessons from the COVID-19 pandemic. *Journal of Risk Research*. 23:7-8, 880-887, <https://doi.org/10.1080/13669877.2020.1756379>

Bueno-Notivol, J., Gracia-García, P., Olaya, B., Lasheras, I., López-Antón, R., & Santabárbara, J. (2021). Prevalence of depression during the COVID-19 outbreak: A meta-analysis of community-based studies. *International Journal of Clinical and Health Psychology*. 21(1):100196. <https://doi.org/10.1016/j.ijchp.2020.07.007>

Burkardt, H. J. (2011). Pandemic H1N1 2009 ('swine flu'): diagnostic and other challenges. *Expert Review of Molecular Diagnostics*. (1):35-40. <https://doi.org/10.1586/erm.10.102>

Centers for Disease Control and Prevention. (2021). *Covid-19 vaccines work*. *Centers for Disease Control and Prevention*. Retrieved March 27, 2022, from <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/effectiveness/work.html#:~:text=COVID%2D19%20vaccines%20are%20effective%20at%20preventing%20infection%2C%20serious%20illness,is%20called%20a%20breakthrough%20infection.>

Centers for Disease Control and Prevention. (2021). How coronavirus spreads. *Centers for Disease Control and Prevention*. Retrieved November 23, 2021, from <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html>.

Centers for Disease Control and Prevention. (2020). *How to protect yourself & others*. *Centers for Disease Control and Prevention*. Retrieved November 23, 2021, from

<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>.

Centers for Disease Control and Prevention. (2021, April 23). NVSS - provisional death counts for Covid-19 - Executive Summary. *Centers for Disease Control and Prevention*.

Retrieved November 23, 2021, from <https://www.cdc.gov/nchs/covid19/mortality-overview.htm>.

Centers for Disease Control and Prevention. (2021). Risk for COVID-19 infection, hospitalization, and death by Race/Ethnicity. *Centers for Disease Control and Prevention*.

Retrieved March 26, 2022, from <https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html>

Centers for Disease Control and Prevention. (2020). Scientific brief: SARS-COV-2 transmission. *Centers for Disease Control and Prevention*. Retrieved November 23, 2021, from

<https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html>.

Centers for Disease Control and Prevention. (2020, March 26). Severe outcomes among patients with coronavirus disease 2019 (COVID-19) - United States, February 12–March 16, 2020.

Centers for Disease Control and Prevention. Retrieved November 23, 2021, from <https://www.cdc.gov/mmwr/volumes/69/wr/mm6912e2.htm>.

Centers for Disease Control and Prevention. (2020). Statistics and maps. *Centers for Disease Control and Prevention*. Retrieved November 23, 2021, from

<https://www.cdc.gov/zika/reporting/index.html>.

- Centers for Disease Control and Prevention. (2021). *Symptoms of COVID-19*. Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>.
- Centers for Disease Control and Prevention. (2022). *What you need to know about variants*. Centers for Disease Control and Prevention. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/variants/about-variants.html>
- Chan, A., Nickson, C. P., Rudolph, J. W., Lee, A., & Joynt, G. M. (2020). Social media for rapid knowledge dissemination: early experience from the COVID-19 pandemic. *Anaesthesia*, 75(12), 1579–1582. <https://doi.org/10.1111/anae.15057>
- Cherry, J. D. & Krogstad P. (2004). SARS: the first pandemic of the 21st century. *Pediatric Research*. 56(1):1-5. <https://doi.org/10.1203/01.PDR.0000129184.87042.FC>
- Dashraath, P., Wong, J. L., Lim, M. X., Lim, L. M., Li, S., Biswas, A., Choolani, M., Mattar, C., Su, L. L. (2020). Coronavirus disease 2019 (COVID-19) pandemic and pregnancy. *American Journal of Obstetrics and Gynecology*. 222(6):521-531. <https://doi.org/10.1016/j.ajog.2020.03.021>
- de Oliveira, W. K., de França, G. V. A., Carmo, E. H., Duncan, B. B., de Souza Kuchenbecker, R., & Schmidt, M. I. (2017). Infection-related microcephaly after the 2015 and 2016 Zika virus outbreaks in Brazil: a surveillance-based analysis. *The Lancet*. 390(10097):861-870. [https://doi.org/10.1016/S0140-6736\(17\)31368-5](https://doi.org/10.1016/S0140-6736(17)31368-5)
- Dennis, D., Radnitz, C. & Wheaton, M.G. (2021) A Perfect Storm? Health Anxiety, Contamination Fears, and COVID-19: Lessons Learned from Past Pandemics and Current Challenges. *International Journal of Cognitive Therapy*. 14, 497–513. <https://doi.org/10.1007/s41811-021-00109-7>

- Del Rio, C., Collins, L. F., & Malani, P. (2020). Long-term Health Consequences of COVID-19. *JAMA Network*. 324(17):1723-1724. <https://doi.org/10.1001/jama.2020.19719>
- Dennis, D., Radnitz, C., & Wheaton, M. G. (2021). A Perfect Storm? Health Anxiety, Contamination Fears, and COVID-19: Lessons Learned from Past Pandemics and Current Challenges. *International Journal of Cognitive Therapy*, 1–17. Advance online publication. <https://doi.org/10.1007/s41811-021-00109-7>
- Doherty-Torstrick, E. R., Walton, K. E., & Fallon, B. A. (2016). Cyberchondria: Parsing Health Anxiety From Online Behavior. *Psychosomatics*. 57(4):390-400. <https://doi.org/10.1016/j.psych.2016.02.002>
- Donaldson, S. I., Grant-Vallone, E. J. (2002). Understanding Self-Report Bias in Organizational Behavior Research. *Journal of Business and Psychology* 17, 245–260. <https://doi.org/10.1023/A:1019637632584>
- Dozois, D. J. A., & Mental Health Research Canada. (2021). Anxiety and depression in Canada during the COVID-19 pandemic: A national survey. *Canadian Psychology/Psychologie canadienne*, 62(1), 136–142. <https://doi.org/10.1037/cap0000251>
- Eilenberg, T., Frosthalm, L., Schroder, A., Jensen, J. S., & Fink, P. (2015) Long-term consequences of severe health anxiety on sick leave in treated and untreated patients: analysis alongside a randomised controlled trial. *Journal of Anxiety Disorders* 32, 95–102. <https://doi.org/10.1016/j.janxdis.2015.04.001>
- El Keshky, M., Alsabban, A. M., & Basyouni, S. S. (2021). The psychological and social impacts on personal stress for residents quarantined for COVID-19 in Saudi Arabia. *Archives of psychiatric nursing*, 35(3), 311–316. <https://doi.org/10.1016/j.apnu.2020.09.008>

- Fekih-Romdhane, F., Ghrissi, F., Abbassi, B., Cherif, W., & Cheour, M. (2020). Prevalence and predictors of PTSD during the COVID-19 pandemic: Findings from a Tunisian community sample. *Psychiatry research*, 290, 113131. <https://doi.org/10.1016/j.psychres.2020.113131>
- Fergus, T. A., & Bardeen, J. R. (2013). Anxiety sensitivity and intolerance of uncertainty: Evidence of incremental specificity in relation to health anxiety. *Personality and Individual Differences*, 55(6), 640–644. <https://doi.org/10.1016/j.paid.2013.05.016>
- Fergus, T. A., & Valentiner, D. P. (2011). Intolerance of uncertainty moderates the relationship between catastrophic health appraisals and health anxiety. *Cognitive Therapy and Research*, 35(6), 560–565. <https://doi.org/10.1007/s10608-011-9392-9>
- Feter, N., Lucia Caputo, E., Doring, I., & Cassuriaga J. (2020). Sharp increase in depression and anxiety among Brazilian adults during the COVID-19 pandemic: findings from the PAMPA cohort. *Public Health*. <https://doi.org/10.1016/j.puhe.2020.11.013>
- Fink, P., Ørnbøl, E., & Christensen, K. S. (2010). The outcome of health anxiety in primary care. A two-year follow-up study on health care costs and self-rated health. *PloS one*, 5(3), e9873. <https://doi.org/10.1371/journal.pone.0009873>
- Fiorillo A, & Gorwood P. (2020). The consequences of the COVID-19 pandemic on mental health and implications for clinical practice. *European Psychiatry*. 63(1):e32. <https://doi.org/10.1192/j.eurpsy.2020.35>
- French J. H. & Hameed S. (2021). Illness Anxiety Disorder. *StatPearls*. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK554399/>
- Gamonal-Limcaoco, S., Montero-Mateos, E., Lozano-López, M. T., Maciá-Casas, A., Matías-Fernández, J., & Roncero, C. (2021). Perceived stress in different countries at the

beginning of the coronavirus pandemic. *The International Journal of Psychiatry in Medicine*. <https://doi.org/10.1177/00912174211033710>

García-Portilla, P., de la Fuente Tomás, L., Bobes-Bascarán, T., Jiménez Treviño, L., Zurrón Madera, P., Suárez Álvarez, M., Menéndez Miranda, I., García Álvarez, L., Sáiz Martínez, P., & Bobes, J. (2021) Are older adults also at higher psychological risk from COVID-19?, *Aging & Mental Health*, 25:7, 1297-1304, <https://doi.org/10.1080/13607863.2020.1805723>

Garg, S., Kim, L., Whitaker, M., et al. (2020). Hospitalization Rates and Characteristics of Patients Hospitalized with Laboratory-Confirmed Coronavirus Disease 2019 — COVID-NET, 14 States, March 1–30, 2020. *Morbidity and Mortality Weekly Report*. 69:458–464. <http://dx.doi.org/10.15585/mmwr.mm6915e3>

Garske, T., Legrand, J., Donnelly, C. A., Ward, H., Cauchemez, S., Fraser, C., Ferguson, N. M., & Ghani, A. C. (2009). Assessing the severity of the novel influenza A/H1N1 pandemic. *BMJ*. 339:b2840. <https://doi.org/10.1136/bmj.b2840>

Gerolimos, L. A., & Edelstein, B. A. (2012). Anxiety-related constructs mediate the relation between age and health anxiety. *Aging & Mental Health*, 16(8), 975–982. <https://doi.org/10.1080/13607863.2012.688192>

Giebel, C., Cannon, J., Hanna, K., Butchard, S., Eley, R., Gaughan, A., Komuravelli, A., Shenton, J., Callaghan, S., Tetlow, H., Limbert, S., Whittington, R., Rogers, C., Rajagopal, M., Ward, K., Shaw, L., Corcoran, R., Bennett, K., Gabbay, M. (2021). Impact of COVID-19 related social support service closures on people with dementia and unpaid carers: a qualitative study. *Aging & Mental Health*. (7):1281-1288. <https://doi.org/10.1080/13607863.2020.1822292>

- Glowacz F, Schmits E. (2020). Psychological distress during the COVID-19 lockdown: The young adults most at risk. *Psychiatry Research*. 293:113486.
<https://doi.org/10.1016/j.psychres.2020.113486>
- Gostin, L. O. & Wiley, L. F. (2020). Governmental Public Health Powers During the COVID-19 Pandemic: Stay-at-home Orders, Business Closures, and Travel Restrictions. *JAMA*. 323(21):2137-2138. <https://doi.org/10.1001/jama.2020.5460>. PMID: 32239184
- Ho, G. W. K. (2017). Examining Perceptions and Attitudes: A Review of Likert-Type Scales Versus Q-Methodology. *Western Journal of Nursing Research*, 39(5), 674–689. <https://doi.org/10.1177/0193945916661302>
- Hofmann, S. (2021). The Impact of COVID-19 on mental health. *Cognitive behaviour therapy*. 50. 185-190. <https://doi.org/10.1080/16506073.2021.1897666>.
- Holder-Perkins, V., Wise, T. N., & Williams, D. E. (2000). Hypochondriacal Concerns: Management Through Understanding. *Primary care companion to the Journal of clinical psychiatry*, 2(4), 117–121. <https://doi.org/10.4088/pcc.v02n0402>
- Howard, G. S., & Dailey, P. R. (1979). Response-shift bias: A source of contamination of self-report measures. *Journal of Applied Psychology*, 64(2), 144–150. <https://doi.org/10.1037/0021-9010.64.2.144>
- Hui, D. S., Wong, P. C., & Wang, C. (2003). SARS: clinical features and diagnosis. *Respirology*. 8 Suppl(Suppl 1):S20-4. <https://doi.org/10.1046/j.1440-1843.2003.00520.x>
- Islam, M. A., Barna, S. D., Raihan, H., Khan, M. N. A., & Hossain, M. T. (2020). Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey. *PLOS ONE*.
<https://doi.org/10.1371/journal.pone.0238162>.

- Jasper, F., & Witthöft, M. (2011). Health anxiety and attentional bias: the time course of vigilance and avoidance in light of pictorial illness information. *Journal of Anxiety Disorders*, 25(8):1131-8. <https://doi.org/10.1016/j.janxdis.2011.08.004>
- Kahn, J. S. & McIntosh, K. (2005). History and recent advances in coronavirus discovery. *The Pediatric Infectious Disease Journal*. (11 Suppl):S223-7, discussion S226. <https://doi.org/10.1097/01.inf.0000188166.17324.60>
- Kazan Kizilkurt, O., Dilbaz, N., & Noyan, C. O. (2020). Psychological Impact of COVID-19 Pandemic on General Population in Turkey: Risk Factors. *Asia Pacific Journal of Public Health*, 32(8), 519–519. <https://doi.org/10.1177/1010539520964276>
- Kebede, M. A., Demissie, D. B., Guddu, D. K., Haile, M. T., Bitew, Z. W., & Muleta, M. B. (2021). Emotional responses and perceived stressors of frontline medical staffs in case of COVID-19 treatment centers and obstetrics emergency in Ethiopia. *BMC Psychiatry*, 21. <https://doi-org.umiss.idm.oclc.org/10.1186/s12888-021-03311-1>
- Kibbey, M, Fedorenko E & Farris S (2021). Anxiety, depression, and health anxiety in undergraduate students living in initial US outbreak “hotspot” during COVID-19 pandemic. *Cognitive Behaviour Therapy*, 50:5, 409-421, <https://doi.org/10.1080/16506073.2020.1853805>
- Kirmizi, M., Yalcinkaya, G., Sengul, Y. S. (2021) Gender differences in health anxiety and musculoskeletal symptoms during the COVID-19 pandemic. *Journal of Back and Musculoskeletal Rehabilitation*. 34(2):161-167. <https://doi.org/10.3233/BMR-200301>
- Kokou-Kpolou, C. K., Megalakaki, O., Laimou, D., & Kousouri, M. (2020). Insomnia during COVID-19 pandemic and lockdown: Prevalence, severity, and associated risk factors in

- French population. *Psychiatry Research*. 290:113128.
<https://doi.org/10.1016/j.psychres.2020.113128>
- Kotera, Y., Ozaki, A., & Miyatake, H. (2021) Mental health of medical workers in Japan during COVID-19: Relationships with loneliness, hope and self-compassion. *Current Psychology*. 40, 6271–6274. <https://doi.org/10.1007/s12144-021-01514-z>
- Kutana, S., & Lau, P. H. (2021). The impact of the 2019 coronavirus disease (COVID-19) pandemic on sleep health. *Canadian Psychology/Psychologie canadienne*, 62(1), 12–19. <https://doi.org/10.1037/cap0000256>
- Labrague, L. J., & De Los Santos, J. A. A. (2020). COVID-19 anxiety among front-line nurses: Predictive role of organisational support, personal resilience and social support. *Journal of Nursing Management*. 28(7):1653-1661. <https://doi.org/10.1111/jonm.13121>
- Lauri Korajlija, A., & Jokic-Begic, N. (2020). COVID-19: Concerns and behaviours in Croatia. *British journal of health psychology*, 10.1111/bjhp.12425. Advance online publication. <https://doi.org/10.1111/bjhp.12425>
- Lee, A. M., Wong, J. G., McAlonan, G. M., Cheung, V., Cheung, C., Sham, P. C., Chu, C. M., Wong, P. C., Tsang, K. W., Chua, S. E. (2007) Stress and psychological distress among SARS survivors 1 year after the outbreak. *The Canadian Journal of Psychiatry*. 52(4):233-40. <https://doi.org/10.1177/070674370705200405>
- Lewis, N., Martinez, L. S., Freres, D. R., Schwartz, S., Armstrong, K., Gray, S. W., Frazee, T., Ngler, R. H., Bougorin, A., & Hornik, R. C. (2012). Seeking cancer-related information from media and family/friends increases fruit consumption among cancer patients. *Health Communication*, 27(4), 380–388. <https://doi.org/10.1080/10410236.2011.586990>

- Li, J., Yang, Z., Qiu, H., Wang, Y., Jian, L., Ji, J., & Li, K. (2020). Anxiety and depression among general population in China at the peak of the COVID-19 epidemic. *World psychiatry: official journal of the World Psychiatric Association (WPA)*, 19(2), 249–250. <https://doi.org/10.1002/wps.20758>
- Li, Z., Ge, J., Yang, M., Feng, J., Qiao, M., Jiang, R., Bi, J., Zhan, G., Xu, X., Wang, L., Zhou, Q., Zhou, C., Pan, Y., Liu, S., Zhang, H., Yang, J., Zhu, B., Hu, Y., Hashimoto, K., Jia, Y., Wang, H., Wang, R., Liu, C., Yang, C. (2020). Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. *Brain, Behavior, and Immunity*. 88:916-919. <https://doi.org/10.1016/j.bbi.2020.03.007>
- Lin, D., Friedman, D.B., Qiao, S., Tam, C., Li, X., & Li, X. (2020). Information uncertainty: a correlate for acute stress disorder during the COVID-19 outbreak in China. *BMC Public Health* 20, 1867. <https://doi.org/10.1186/s12889-020-09952-3>
- Liu, Y. C., Kuo, R. L., & Shih, S. R. (2020). COVID-19: The first documented coronavirus pandemic in history. *Biomed Journal*. 43(4):328-333. <https://doi.org/10.1016/j.bj.2020.04.007>
- López-Morales, H., Del Valle, M. V., Canet-Juric, L., Andrés, M. L., Galli, J. I., Poó, F., & Urquijo, S. (2021). *Mental health of pregnant women during the COVID-19 pandemic: A longitudinal study*. *Psychiatry research*, 295, 113567. <https://doi.org/10.1016/j.psychres.2020.113567>
- Lu, J., Gu, J., Li, K., Xu, C., Su, W., Lai, Z., Zhou, D., Yu, C., & Yang, Z. (2020). COVID-19 outbreak associated with air conditioning in restaurant, Guangzhou, China, 2020. *Emerging Infectious Diseases*, 26(7). <https://doi.org/10.3201/eid2607.200764>

- Maass, U., Kuhne, F., & Maas, J. (2020). Psychological interventions for health anxiety and somatic symptoms: A Systematic Review and Meta-Analysis. *Zeitschrift für Psychologie*.
<https://doi.org/10.1027/2151-2604/a000400>
- MacSwain, K. L. H., Sherry, S. B., Stewart, S. H., Watt, M. C., Hadjistavropoulos, H. D., & Graham, A. R. (2009). Gender differences in health anxiety: An investigation of the interpersonal model of health anxiety. *Personality and Individual Differences*, 47(8), 938–943. <https://doi.org/10.1016/j.paid.2009.07.020>
- Main, A., Zhou, Q., Ma, Y., Luecken, L. J., Liu, X. (2011). Relations of SARS-related stressors and coping to Chinese college students' psychological adjustment during the 2003 Beijing SARS epidemic. *Journal of Counseling Psychology*. 58(3):410-23.
<https://doi.org/10.1037/a0023632>
- Mileti, D. S., & Peek, L. (2002). Understanding individual and social characteristics in the promotion of household disaster preparedness. In T. Deitz & P. C. Stern (Eds.), *New tools for environmental protection: Education, information, and voluntary measures* (pp. 125–140). National Academies Press.
- Moghanibashi-Mansourieh A. (2020). Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian Journal of Psychiatry*. 51:102076.
<https://doi.org/10.1016/j.ajp.2020.102076>
- Morens, D., Folkers, G. K., & Fauci, A. S. (2009). What Is a Pandemic? *The Journal of Infectious Diseases*, Volume 200, Issue 7, Pages 1018–1021, <https://doi.org/10.1086/644537>

- Musso, D., Ko, A. I., & Baud, D. (2019). Zika Virus Infection - After the Pandemic. *The New England Journal of Medicine*. 381(15):1444-1457.
<https://doi.org/10.1056/NEJMra1808246>
- Nazione, S., Perrault, E. & Pace, K. (2021) Impact of Information Exposure on Perceived Risk, Efficacy, and Preventative Behaviors at the Beginning of the COVID-19 Pandemic in the United States, *Health Communication*, 36:1, 23-31, <https://doi.org/10.1080/10410236.2020.1847446>
- Obsessive Compulsive Cognitions Working Group. (1997). Cognitive assessment of obsessive-compulsive disorder. *Behaviour Research and Therapy*, 35 (7), 667–681.
- Olatunji, B. O., Etzel, E. N., Tomarken, A. J., Ciesielski, B. G., Deacon, B. (2011). The effects of safety behaviors on health anxiety: An experimental investigation. *Behaviour Research and Therapy*, pp. 719-728, <https://doi.org/10.1016/j.brat.2011.07.008>
- Petersen, E., Koopmans, M., Go, U., Hamer, D. H., Petrosillo, N., Castelli, F., Storgaard, M., Al Khalili, S., & Simonsen, L. (2020) Comparing SARS-CoV-2 with SARS-CoV and influenza pandemics. *Lancet Infectious Diseases*. 20(9):e238-e244.
[https://doi.org/10.1016/S1473-3099\(20\)30484-9](https://doi.org/10.1016/S1473-3099(20)30484-9)
- Petrosky-Nadeau, N. & Valletta R. G. (2020). Unemployment Paths in a Pandemic Economy, *Federal Reserve Bank of San Francisco Working Paper 2020-18*. <https://doi.org/10.24148/wp2020-18>
- Raifman, J., Bor, J., & Venkataramani, A. (2021). Association Between Receipt of Unemployment Insurance and Food Insecurity Among People Who Lost Employment During the COVID-19 Pandemic in the United States. *JAMA network open*, 4(1), e2035884. <https://doi.org/10.1001/jamanetworkopen.2020.35884>

- Rachman, S. (2012) Health anxiety disorders: a cognitive construal. *Behavioral Research Therapy*. 50, 502–512. <https://doi.org/10.1016/j.brat.2012.05.001>
- Ramdas, K., Darzi, A. & Jain, S. ‘Test, re-test, re-test’: using inaccurate tests to greatly increase the accuracy of COVID-19 testing. *Nature Medicine*. 26, 810–811 (2020).
<https://doi.org/10.1038/s41591-020-0891-7>
- Roberts, N. J., McAloney-Kocaman, K., Lippiett, K., Ray, E., Welch, L., & Kelly, C. (2021). Levels of resilience, anxiety and depression in nurses working in respiratory clinical areas during the COVID pandemic. *Respiratory Medicine*. 176:106219.
<https://doi.org/10.1016/j.rmed.2020.106219>
- Rohde, N., Tang, K. K., Osberg, L., & Rao, P. (2016) The effect of economic insecurity on mental health: Recent evidence from Australian panel data. *Social Science & Medicine*. 151:250-8. <https://doi.org/10.1016/j.socscimed.2015.12.014>
- Rudensine, S., McNeal, K., Schulder, T., Ettman, C.K., Hernandez, M., Gvozdieva, K. and Galea, S. (2021), Depression and Anxiety During the COVID-19 Pandemic in an Urban, Low-Income Public University Sample. *Journal of Traumatic Threat*, 34: 12-22. <https://doi.org/10.1002/jts.22600>.
- Saadati, N., Afshari, P., Boostani, H., Beheshtinasab, M., Abedi, P., & Maraghi, E. (2021). Health anxiety and related factors among pregnant women during the COVID-19 pandemic: A cross-sectional study from Iran. *BMC Psychiatry*, 21. <https://doi.org.umiss.idm.oclc.org/10.1186/s12888-021-03092-7>
- Salari, N., Hosseinian-Far, A., Jalali, R., Vaisi-Raygani, A., Rasoulpoor, S., Mohammadi, M., Rasoulpoor, S., & Khaledi-Paveh, B (2020). Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and

- meta-analysis. *Globalization and Health* 16, 57. <https://doi.org/10.1186/s12992-020-00589-w>
- Salian, V. S., Wright, J. A., Vedell, P. T., Nair, S., Li, C., Kandimalla, M., Tang, X., Carmona Porquera, E. M., Kalari, K. R., Kandimalla, K. K. (2021). COVID-19 Transmission, Current Treatment, and Future Therapeutic Strategies. *Molecular Pharmaceutics*. 18(3):754-771. <https://doi.org/10.1021/acs.molpharmaceut.0c00608>
- Salkovskis P. M., Rimes K. A., Warwick H. M., & Clark D. M. (2002). The health anxiety inventory: Development and validation of scales for the measurement of health anxiety and hypochondriasis. *Psychological Medicine*. 32:843–853. <https://doi.org/10.1017/S0033291702005822>.
- Santabárbara, J., Lasheras, I., Lipnicki, D. M., Bueno-Notivol, J., Pérez-Moreno, M., López-Antón, R., De la Cámara, C., Lobo, A., & Gracia-García, P. Prevalence of anxiety in the COVID-19 pandemic: An updated meta-analysis of community-based studies. *Progress in Neuro-psychopharmacology and Biological Psychiatry*. 109:110207. <https://doi.org/10.1016/j.pnpbp.2020.110207>
- Severin, R., Arena, R., Lavie, C. J., Bond, S., & Phillips, S. A. (2020). Respiratory Muscle Performance Screening for Infectious Disease Management Following COVID-19: A Highly Pressurized Situation. *The American journal of medicine*, 133(9), 1025–1032. <https://doi.org/10.1016/j.amjmed.2020.04.003>
- Singh, J. (2020). COVID -19 and its impact on society. *Electronic Research Journal of Social Sciences and Humanities*. Volume 2, Issue I. pp. 102-105

- Shah, K., Kamrai, D., Mekala, H., Mann, B., Desai, K., & Patel, R. S. (2020) Focus on Mental Health During the Coronavirus (COVID-19) Pandemic: Applying Learnings from the Past Outbreaks. *Cureus*. 12(3):e7405. <https://doi.org/10.7759/cureus.7405>
- Shahyad, S., & Mohammadi, M. T. (2020). Psychological impacts of covid-19 outbreak on Mental Health Status of society individuals: A narrative review. *Journal of Military Medicine*. Retrieved November 23, 2021, from <https://militarymedj.ir/article-1-2479-en.html>.
- Shoshani, A., & Kor, A. (2021). The mental health effects of the COVID-19 pandemic on children and adolescents: Risk and protective factors. *Psychological Trauma: Theory, Research, Practice, and Policy*. <https://doi-org.umiss.idm.oclc.org/10.1037/tra0001188>
- Shigemura, J., Ursano, R. J., Morganstein, J. C., Kurosawa, M., & Benedek, D. M. (2020). Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry and Clinical Neuroscience*. 74(4):281-282. <https://doi.org/10.1111/pcn.12988>
- Solem, S., Borgejordet, S., Haseth, S., & Hansen, B. (2015). Symptoms of health anxiety in obsessive-compulsive disorder: Relationship with treatment outcome and metacognition. *Journal of Obsessive-Compulsive and Related Disorders*. <https://doi.org/10.1016/j.jocrd.2015.03.002>
- Spielberger, C. D. (Ed.). (2013). *Anxiety and behavior*. Academic Press.
- Taha, S., Matheson, K., Cronin, T., & Anisman, H. (2014). Intolerance of uncertainty, appraisals, coping, and anxiety: the case of the 2009 H1N1 pandemic. *British Journal of Health Psychology*. 19(3):592-605. <https://doi.org/10.1111/bjhp.12058>

- Targher G, Mantovani A, Byrne CD, Wang XB, Yan HD, Sun QF, Pan KH, Zheng KI, Chen YP, Eslam M, George J, Zheng MH. (2020). Risk of severe illness from COVID-19 in patients with metabolic dysfunction-associated fatty liver disease and increased fibrosis scores. *Gut*. 2020 Aug;69(8):1545-1547. <https://doi.org/10.1136/gutjnl-2020-321611>
- Tausczik, Y., Faasse, K., Pennebaker, J. W., Petrie, K. J. (2012). Public anxiety and information seeking following the H1N1 outbreak: blogs, newspaper articles, and Wikipedia visits. *Health Communication*. 27(2):179-85. <https://doi.org/10.1080/10410236.2011.571759>
- Taylor, S., & Asmundson, G. J. G. (2004). Treating health anxiety: A cognitive-behavioral approach. *The Guilford Press*.
- Thrasher, J. F., Abad-Vivero, E. N., Huang, L., O'Connor, R. J., Hammond, D., Bansal-Travers, M., Yong, H., Borland, R., Markovsky, B., & Hardin, J. (2016). Interpersonal communication about pictorial health warnings on cigarette packages: Policy-related influences and relationships with smoking cessation attempts. *Social Science & Medicine*, 164(1), 141–149. <https://doi.org/10.1016/j.socscimed.2015.05.042>
- Tizzoni, M., Panisson, A., Paolotti, D., & Cattuto, C. (2020). The impact of news exposure on collective attention in the United States during the 2016 Zika epidemic. *PLoS computational biology*, 16(3), e1007633. <https://doi.org/10.1371/journal.pcbi.1007633>
- Toulabi, T., Pour, F. J., Veiskramian, A., & Heydari, H. (2021). Exploring COVID-19 patients' experiences of psychological distress during the disease course: A qualitative study. *BMC Psychiatry*, 21. <https://doi-org.umiss.idm.oclc.org/10.1186/s12888-021-03626-z>
- Tyrer, P. (2020). COVID-19 health anxiety. *Wiley Online Library*. Retrieved November 23, 2021, from <https://doi.org/10.1002/wps.20798>

- Tyrer, P. (2018). Recent Advances in the Understanding and Treatment of Health Anxiety. *Current Psychiatry Reports*. 20, 49. <https://doi.org/10.1007/s11920-018-0912-0>
- Tyrer, P., Cooper, S., Crawford, M., Dupont, S., Green, J., Murphy, D., Salkovskis, P., Smith, G., Wang, D., Bhogal, S., Keeling, M., Loebenberg, G., Seivewright, R., Walker, G., Cooper, F., Evered, R., Kings, S., Kramo, K., McNulty, A., Nagar, J., Reid, S., Sanatinia, R., Sinclair, J., Trevor, D., Watson, C., & Tyrer, H. (2011) Prevalence of health anxiety problems in medical clinics. *Journal of Psychosomatic Research*.71(6):392-4. <https://doi.org/10.1016/j.jpsychores.2011.07.004>
- Tyrer, P., & Tyrer, H. (2018). Health anxiety: Detection and treatment. *BJ Psych Advances*, 24(1), 66-72. <https://doi.org/10.1192/bja.2017.5>
- Van Damme, W., Dahake, R., Delamou, A., Ingelbeen, B., Wouters, E., Vanham, G., van de Pas, R., Dossou, J. P., Ir, P., Abimbola, S., Van der Borgh, S., Narayanan, D., Bloom, G., Van Engelgem, I., Ag Ahmed, M. A., Kiendrébéogo, J. A., Verdonck, K., De Brouwere, V., Bello, K., Kloos, H., Aaby, P., Kalk, A., Al-Awlaqi, S., Prashanth, N. S., Muyembe-Tamfum, J., Mbala, P., Ahuka-Mundeke, S., & Assefa, Y. (2020). The COVID-19 pandemic: diverse contexts; different epidemics-how and why?. *BMJ global health*, 5(7), e003098. <https://doi.org/10.1136/bmjgh-2020-003098>
- Waggoner, J. J., Pinsky, B. A. (2016). Zika Virus: Diagnostics for an Emerging Pandemic Threat. *Journal of Clinical Microbiology*. 54(4):860-7. <https://doi.org/10.1128/JCM.00279-16>
- Ware J, Kosinski M (2001) SF-36 Physical & Mental Health Summary Scales: A Manual for Users of Version 1. Lincoln, RI: Quality Metric Incorporated.

- Warwick, H. M. & Salkovskis, P. M. (1990). Hypochondriasis. *Behaviour Research and Therapy*. 28(2):105-17. [https://doi.org/10.1016/0005-7967\(90\)90023-c](https://doi.org/10.1016/0005-7967(90)90023-c)
- Welch Cline, R. J. (2003). Everyday interpersonal communication and health. In T. L. Thompson, A. M. Dorsey, K. I. Miller, & R. Parrott (Eds.), *Handbook of health communication* (pp. 285–318). *Lawrence Erlbaum Associates*.
- Wheaton, M. G., Abramowitz, J. S., Berman, N. C., Fabricant, L. E., & Olatunji, B. O. (2012). Psychological predictors of anxiety in response to the H1N1 (swine flu) pandemic. *Cognitive Therapy and Research*, 36(3), 210–218. <https://doi.org/10.1007/s10608-011-9353-3>
- World Health Organization. (2022). Tracking SARS-COV-2 variants. *World Health Organization*. Retrieved March 27, 2022, from <https://www.who.int/en/activities/tracking-SARS-CoV-2-variants/>
- World Health Organization. (2021). Who director-general's opening remarks at the media briefing on COVID-19 - 11 march 2020. *World Health Organization*. Retrieved November 23, 2021, from <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>.
- Wu, D., Yang, T., Hall, D.L., Jiao, G., Huang, L., & Jiao, C. (2021). COVID-19 uncertainty and sleep: the roles of perceived stress and intolerance of uncertainty during the early stage of the COVID-19 outbreak. *BMC Psychiatry* 21, 306. <https://doi.org/10.1186/s12888-021-03310-2>.
- Yen, M. Y., Chiu, A. W., Schwartz, J., King, C. C., Lin, Y. E., Chang, S. C., Armstrong, D., & Hsueh, P. R. (2014). From SARS in 2003 to H1N1 in 2009: lessons learned from Taiwan

in preparation for the next pandemic. *The Journal of Hospital Infection*. 87(4):185-93.

<https://doi.org/10.1016/j.jhin.2014.05.005>

Zhong, N. S., Zheng, B. J., Li, Y. M., Poon, Xie, Z. H., Chan, K. H., Li, P. H., Tan, S. Y., Chang,

Q., Xie, J. P., Liu, X. Q., Xu, J., Li, D. X., Yuen, K. Y., Peiris, Guan, Y. (2003).

Epidemiology and cause of severe acute respiratory syndrome (SARS) in Guangdong,

People's Republic of China, in February, 2003. *The Lancet*. 362(9393):1353-8.

[https://doi.org/10.1016/s0140-6736\(03\)14630-2](https://doi.org/10.1016/s0140-6736(03)14630-2)

Table 1.
Sociodemographic Characteristics and COVID-19 Impacts

| Characteristics | | n (%) |
|---------------------------------|----------------------------------|------------------|
| Sex | Female | 168 (63.9) |
| | Male | 95 (36.1) |
| Age (mean \pm SD) | | 19.57 \pm 2.96 |
| Race/Ethnicity | White | 199 (75.7) |
| | Black | 38 (14.4) |
| | Asian | 8 (3.0) |
| | Multiracial | 7 (2.7) |
| | Latinx | 6 (2.3) |
| | Other | 3 (1.2) |
| | Prefer not to say | 2 (0.8) |
| Student Classification | Freshman (1 st year) | 177 (67.3) |
| | Sophomore (2 nd year) | 54 (20.5) |
| | Junior (3 rd year) | 19 (7.2) |
| | Senior (4 th year) | 11 (4.2) |
| | Other | 2 (0.8) |
| Housing – Pre-COVID-19 | Dormitory/Greek housing | 156 (59.3) |
| | Off campus – friends/roommates | 52 (19.8) |
| | Off campus – family | 49 (18.7) |
| | Live alone | 6 (2.3) |
| Housing Relocation – COVID-19 | | 210 (79.8) |
| Current Housing – COVID-19 | Off campus – family | 179 (68.1) |
| | Off campus – family | 39 (14.8) |
| | Off campus – family | 22 (6.4) |
| | Off campus – friends/roommates | 16 (6.1) |
| | Dormitory | 5 (1.9) |
| | Living alone | 2 (0.8) |
| | Self | 1 (0.4) |
| COVID-19 Positive Test | Family member/close friend | 28 (10.6) |
| | Acquaintance | 116 (44.1) |
| | None | 5 (1.9) |
| Severity of COVID-19 Impact | A Little | 32 (12.2) |
| | Moderate | 155 (58.9) |
| | A Great Deal | 60 (22.8) |
| | Extremely | 11 (4.2) |
| | 0–1 hour | 14 (5.3) |
| Social Media Usage | 1–4 hours | 144 (54.8) |
| | 5–9 hours | 87 (33.1) |
| | 10–14 hours | 15 (5.7) |
| | 15–20 hours | 3 (1.1) |
| | Currently Employed | |
| Employment Affected by COVID-19 | Yes | 84 (31.9) |
| | No | 158 (60.0) |
| | Not yet | 21 (8.0) |

Table 2

Frequencies of COVID-19 Preventative Actions

| Preventative Actions Taken | <i>n</i> (%) |
|--|--------------|
| 1. Washing hands often with soap and water for at least 20 seconds. | 232 (88.2) |
| 2. Avoiding touching your eyes, nose, and mouth with unwashed hands. | 192 (73.0) |
| 3. Repeatedly checking for news and updates on COVID-19 throughout the day. | 134 (51.0) |
| 4. Keeping informed about developments and recommendations. | 188 (71.5) |
| 5. Repeatedly asking or checking for reassurance from authority figures, health care providers, and other officials that COVID-19 will not affect you. | 53 (20.2) |
| 6. Mentally reviewing your activities to make sure that you did not come in contact with COVID-19. | 108 (41.1) |
| 7. Engaging in social distancing. | 230 (87.5) |
| 8. Cancellation of travel. | 163 (62.0) |
| 9. Staying home as much as possible. | 235 (89.4) |
| 10. Cancellation of activities, such as social events and sports activities. | 222 (84.4) |
| 11. Regularly disinfect frequently touched surfaces (cell phones, keyboards, doorknobs, light switches, desks, etc.) | 157 (59.7) |
| 12. Stockpile on food products and other consumables. | 119 (45.2) |
| 13. Stockpile on paper goods, such as toilet paper and paper towels. | 85 (32.3) |
| 14. Stockpile on cleaning and sanitization products. | 90 (34.2) |
| 15. Covering coughs and sneezes with the inside of your elbow or with a clean tissue. Throwing away dirty tissues immediately. | 218 (82.9) |

Table 3

Pearson Bivariate Correlations of COVID-19 Anxiety and Health Anxiety

| | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------|--------|--------|--------|--------|-------|
| 1. Negative Consequences | – | | | | |
| 2. Illness Likelihood | .497** | – | | | |
| 3. Health Anxiety Total | .689** | .971** | – | | |
| 4. COVID-19 Anxiety | .300** | .342** | .368** | – | |
| 5. COVID-19 Preventative Actions | .102 | .088 | .102 | .342** | – |
| Mean | 2.57 | 10.90 | 13.46 | 8.19 | 9.22 |
| <i>SD</i> | 2.01 | 6.14 | 7.35 | 3.54 | 3.35 |
| Range Observed | 10.00 | 31.00 | 37.00 | 20.00 | 15.00 |

Note. Negative consequences = Short Health Anxiety Inventory (SHAI) Negative Consequences subscale; Illness Likelihood = SHAI Illness Likelihood subscale; Health Anxiety Total = SHAI total score; COVID-19 Anxiety = COVID-19 DOCS score; COVID-19 Preventative Actions = COVID-19 Precautions Checklist

** = denotes a correlation is significant at the 0.01 level.

*Appendix A***SHAI (Short Health Inventory)**

Each question in this section consists of a group of four statements. Please read each group of statements carefully and then select the one which best describes your feelings, over the past six months (or other agreed time period). Identify the statement by ringing the letter next to it, i.e. if you think that statement a.) is correct, ring statement a.). It may be that more than one statement applies, in which case, please ring any that are applicable.

1. a.) I do not worry about my health.
b.) I occasionally worry about my health.
c.) I spend much of my time worrying about my health.
d.) I spend most of my time worrying about my health.
2. a.) I notice aches/pains less than most other people (of my age).
b.) I notice aches/pains as much as most other people (of my age).
c.) I notice aches/pains more than most other people (of my age).
d.) I am aware of aches/pains in my body all the time.
3. a.) as a rule I am not aware of bodily sensations or changes.
b.) sometimes I am aware of bodily sensations or changes.
c.) I am often aware of bodily sensations or changes.
d.) I am constantly aware of bodily sensations or changes.
4. a.) resisting thoughts of illness is never a problem.
b.) most of the time I can resist thoughts of illness.
c.) I try to resist thoughts of illness but am often unable to do so.
d.) thoughts of illness are so strong that I no longer even try to resist them.
5. a.) as a rule I am not afraid that I have a serious illness.
b.) I am sometimes afraid that I have a serious illness.
c.) I am often afraid that I have a serious illness.
d.) I am always afraid that I have a serious illness.
6. a.) I do not have images (mental pictures) of myself being ill.
b.) I occasionally have images of myself being ill.
c.) I frequently have images of myself being ill.
d.) I constantly have images of myself being ill.
7. a.) I do not have any difficulty taking my mind off thoughts about my health.
b.) I sometimes have difficulty taking my mind off thoughts about my health.
c.) I often have difficulty in taking my mind off thoughts about my health.
d.) Nothing can take my mind off thoughts about my health.
8. a.) I am lastingly relieved if my doctor tells me there is nothing wrong.
b.) I am initially relieved but the worries sometimes return later.
c.) I am initially relieved but the worries always return later.
d.) I am not relieved if my doctor tells me there is nothing wrong.
9. a.) if I hear about an illness I never think I have it myself.
b.) if I hear about an illness I sometimes think I have it myself.
c.) if I hear about an illness I often think I have it myself.
d.) if I hear about an illness I always think I have it myself.

- 10.** a.) if I have a bodily sensation or change I rarely wonder what it means.
 b.) if I have a bodily sensation or change I often wonder what it means.
 c.) if I have a bodily sensation or change I always wonder what it means.
 d.) if I have a bodily sensation or change I must know what it means.

[cont.]

- 11.** a.) I usually feel at very low risk for developing a serious illness.
 b.) I usually feel at fairly low risk for developing a serious illness.
 c.) I usually feel at moderate risk for developing a serious illness.
 d.) I usually feel at high risk for developing a serious illness.
- 12.** a.) I never think I have a serious illness.
 b.) I sometimes think I have a serious illness.
 c.) I often think I have a serious illness.
 d.) I usually think that I am seriously ill.
- 13.** a.) if I notice an unexplained bodily sensation I don't find it difficult to think about other things.
 b.) if I notice an unexplained bodily sensation I sometimes find it difficult to think about other things.
 c.) if I notice an unexplained bodily sensation I often find it difficult to think about other things.
 d.) if I notice an unexplained bodily sensation I always find it difficult to think about other things.
- 14.** a.) my family/friends would say I do not worry enough about my health.
 b.) my family/friends would say I have a normal attitude to my health.
 c.) my family/friends would say I worry too much about my health.
 d.) my family/friends would say I am a hypochondriac.

For the following questions, please think about what it might be like if you had a serious illness of a type which particularly concerns you (e.g. heart disease, cancer, multiple sclerosis & so on). Obviously you cannot know for definite what it would be like; please give your best estimate of what you *think* might happen, basing your estimate on what you know about yourself and serious illness in general.

- 15.** a.) if I had a serious illness I would still be able to enjoy things in my life quite a lot.
 b.) if I had a serious illness I would still be able to enjoy things in my life a little.
 c.) if I had a serious illness I would be almost completely unable to enjoy things in my life.
 d.) if I had a serious illness I would be completely unable to enjoy life at all.
- 16.** a.) if I developed a serious illness there is a good chance that modern medicine would be able to cure me.
 b.) if I developed a serious illness there is a moderate chance that modern medicine would be able to cure me.
 c.) if I developed a serious illness there is a very small chance that modern medicine would be able to cure me.

d.) if I developed a serious illness there is no chance that modern medicine would be able to cure me.

- 17.** a.) a serious illness would ruin some aspects of my life.
b.) a serious illness would ruin many aspects of my life.
c.) a serious illness would ruin almost every aspect of my life.
d.) a serious illness would ruin every aspect of my life.

- 18.** a.) if I had a serious illness I would not feel that I had lost my dignity.
b.) if I had a serious illness I would feel that I had lost a little of my dignity.
c.) if I had a serious illness I would feel that I had lost quite a lot of my dignity.
d.) if I had a serious illness I would feel that I had totally lost my dignity.
-

Appendix B

COVID-19 Health Questionnaire

| | | |
|---|-----|----|
| The following questions ask about coronavirus disease 2019 (COVID-19). | | |
| 1. Have you tested positive for COVID-19? | Yes | No |
| 2. Has a close friend or family member tested positive for COVID-19? | Yes | No |
| 3. Do you know anyone who has tested positive for COVID-19? | Yes | No |
| 4. Approximately how many different people have you seen each day for the past week? | | |
| 5. Approximately how many public places have you been to during the past week? | | |
| 6. To what extent has your daily schedule and life been affected by COVID-19? No disruption at all. A little disruption, but I mostly function well. Many things are disrupted, but I can still manage. My life is disrupted in many ways and I have trouble managing. My life is completely disrupted and I cannot function at all. | | |

COVID-19 Anxiety Scale

| | |
|--|--|
| The next questions ask about your experiences with <u>thoughts and behaviors</u> related to COVID-19 over the last two weeks. Please circle the number next to your answer. | |
| 7. About how much time have you spent each day thinking about COVID-19 and engaging in washing or cleaning behaviors because of COVID-19? | |
| 0 None at all 1 Less than 1 hour each day 2 Between 1 and 3 hours each day 3 Between 3 and 8 hours each day 4 8 hours or more each day | |
| 8. To what extent have you avoided situations in order to prevent concerns with COVID-19 or having to spend time washing, cleaning, or showering? | |
| 0 None at all 1 A little avoidance 2 A moderate amount of avoidance 3 A great deal of avoidance 4 Extreme avoidance of nearly all things | |
| 9. If you had thoughts about COVID-19, but could not wash, clean, shower, get reassurance, or otherwise decrease perceived threat of COVID-19, how distressed or anxious did you become? | |
| 0 Not at all distressed/anxious 1 Mildly distressed/anxious 2 Moderately distressed/anxious 3 Severely distressed/anxious 4 Extremely distressed/anxious | |
| 10. To what extent has your daily routine (work, school, self-care, social life) been disrupted by thoughts about COVID-19 and excessive checking or asking for reassurance? | |
| 0 No disruption at all. | |

| | |
|---|--|
| 1 | A little disruption, but I mostly function well. |
| 2 | Many things are disrupted, but I can still manage. |
| 3 | My life is disrupted in many ways and I have trouble managing. |
| 4 | My life is completely disrupted and I cannot function at all. |
| 11. How difficult is it for you to disregard thoughts about COVID-19 and refrain from reassurance-seeking behaviors or cleaning behaviors (e.g., washing, showering, cleaning) when you try to do so? | |
| 0 | Not at all difficult |
| 1 | A little difficult |
| 2 | Moderately difficult |
| 3 | Very difficult |
| 4 | Extremely difficult |

| COVID-Precautions Checklist | |
|--|---|
| 12. Which of the following precautions have you taken or are you taking in response to COVID-19? Check all that apply. | |
| <input type="checkbox"/> | Washing hands often with soap and water for at least 20 seconds. |
| <input type="checkbox"/> | Avoiding touching your eyes, nose, and mouth with unwashed hands. |
| <input type="checkbox"/> | Repeatedly checking for news and updates on COVID-19 throughout the day. |
| <input type="checkbox"/> | Repeatedly asking or checking for reassurance from authority figures, health care providers, and other officials that COVID-19 will not affect you. |
| <input type="checkbox"/> | Mentally reviewing your activities to make sure that you did not come in contact with COVID-19 |
| <input type="checkbox"/> | Engaging in social distancing. |
| <input type="checkbox"/> | Staying home as much as possible. |
| <input type="checkbox"/> | Cancelation of travel. |
| <input type="checkbox"/> | Cancelation of activities, such as social events and sports activities. |
| <input type="checkbox"/> | Regularly disinfect frequently touched surfaces (cell phones, keyboards, doorknobs, light switches, desks, etc.) |
| <input type="checkbox"/> | Stockpile on food products and other consumables. |
| <input type="checkbox"/> | Stockpile on paper goods, such as toilet paper and paper towels. |
| <input type="checkbox"/> | Stockpile on cleaning and sanitization products. |
| <input type="checkbox"/> | Covering coughs and sneezes with the inside of your elbow or with a clean tissue. Throwing away dirty tissues immediately. |
| <input type="checkbox"/> | |
| <input type="checkbox"/> | Other _____ |

End of Survey Opportunity to Participate in Additional Surveys

1. We are interested in how stress changes over the semester and would like to have you complete a portion of these surveys again in two weeks for an additional 1.0 credit. Are you interested in participating?

| | |
|--------------------------|-----|
| <input type="checkbox"/> | YES |
|--------------------------|-----|

| | |
|--------------------------|----|
| <input type="checkbox"/> | NO |
|--------------------------|----|

IF YES, please provide your information so that we can send you the Sona Invitation.

PLEASE NOTE: THE BELOW INFORMATION WILL ONLY BE USED TO CONNECT YOUR SURVEYS. YOUR NAME OR PERSONAL INFORMATION WILL NOT BE CONNECTED TO YOUR SURVEY INFORMATION.

Phone number: